OPERATING INFORMATION

COMMUNICATIONS SWEEP OSCILLATOR

8605A

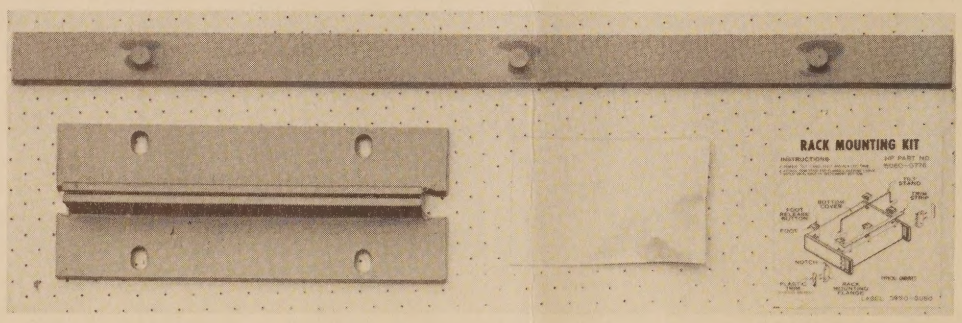
DUPLICATE OF SECTIONS 1 THRU 3
OF YOUR OPERATING AND SERVICE MANUAL

KEEP WITH INSTRUMENT

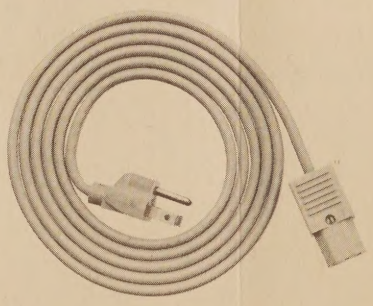
APRIL 1973

HEWLETT hp PACKARD

HP 8605A



RACK MOUNTING KIT



POWER CABLE

Figure 1-1. Model 8605A Communications Sweep Oscillator with Supplied Accessories

SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION

1-2. This manual contains operating and service instructions for the Hewlett-Packard Model 8605A Communications Sweep Oscillator. Included in the manual is the information required to install, operate, test, adjust, and service the Model 8605A Communications Sweep Oscillator. Also included is a replaceable parts list for the instrument.

1-3. Packaged with this basic manual is an Operating Information Supplement. This is simply a reprint of the first three sections of this manual. This supplement should stay with the instrument for use by the instrument operator. Also included with the basic manual is an overall schematic diagram. Additional copies of both the Operating Information Supplement and the Overall Schematic Diagram may be ordered separately through your nearest Hewlett-Packard office. The part numbers are listed on the title page of this manual and on each publication.

1-4. On the front cover of this manual, below the regular manual part number, is a "Microfiche" Part Number. This number may be used to order 4x6-inch microfilm transparencies of the manual. Each 4x6-inch microfiche contains up to 60 photo duplicates of the manual pages. The microfiche package also includes the latest Manual Changes supplement as well as all pertinent Service Notes.

1-5. Critical instrument specifications are listed in Table 1-1. These specifications are the performance standards or limits against which the instrument may be tested.

1-6. INSTRUMENTS COVERED BY MANUAL

1-7. This instrument has a two-part serial number. The first four digits followed by a dash or letter comprise the serial number prefix. The last five-digits form the sequential suffix that is unique to each instrument. The content of this manual applies directly to instruments having the same serial number prefix(es) as those listed on the title page under SERIAL NUMBERS.

1-8. An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. An unlisted serial prefix indicates that the instrument is different from those documented in this manual. Any differences are documented in a yellow Manual Changes Supplement that is packaged with the manual.

1-9. The Manual Changes Supplement contains important information for correcting manual errors and for adapting the contents of this manual to cover any instrument changes that occur after the printing of the manual. These supplements are also revised as often as necessary to keep the manual current and accurate. Hewlett-Packard recommends that you periodically request the latest Manual Changes Supplement. Complimentary copies of these supplements are available from all Hewlett-Packard offices.

1-10. For information concerning a serial number prefix not listed on the title page or in the Manual Changes Supplement, contact your nearest Hewlett-Packard office.

Table 1-1. Specifications (1 of 3)

8605A COMMUNICATIONS SWEEP OSCILLATOR
(With one of seven Standard Frequency Band Options)

70 MHz (IF) SECTION

Frequency Range: 47 to 100 MHz

ΔF Sweep Width Range: 0 to 53 MHz

Frequency Accuracy (25° C):
CW MODE: ± 2 MHz
ΔF MODE CENTER FREQUENCY: Same as CW mode accuracy
ΔF MODE WIDTH: ± 10% of ΔF width being swept.

Frequency Stability:
With Time: ± 50 kHz over a 15-minute interval after a 15-minute warmup.
With Temperature (0 to 50° C): ± 21 kHz per degree Centigrade. Applies to absolute CW frequency, and absolute ΔF center frequency.
With 10% Change in Line Voltage: ± 10 kHz.
With Output Level Change: ± 10 kHz for range of IF power output control - +9 dBm to +11 dBm.
Residual FM-CW Mode: < 1 kHz peak

Linearity: ΔF sweep mode, ± 2.5%, as a % of sweep width.

Maximum Leveled Power Output: +10 dBm, internally leveled.

Power Output Stability with Time: Constant within 0.1 dB over any 15-minute interval.

Power Output Variation (Internally Leveled):
55 to 85 MHz: 0.01 dB peak-to-peak variation.
47 to 100 MHz: 0.1 dB peak-to-peak variation.

Power Output Slope Adjustment Range: +0.1 dB to −0.05 dB.

Spurious Signals (down from fundamental output at +10 dBm):
Harmonics more than 40 dB down.
Nonharmonics more than 50 dB down.

MICROWAVE (RF) SECTION

Specifications	4 GHz Band	6 GHz Band	11 GHz Band	Other Bands Desired[1]
Frequency				
Frequency Range:	3.65 to 4.25 GHz	5.9 to 6.5 GHz	10.7 to 11.7 GHz	1.7 to 13.25 GHz[1]
ΔF Sweep Width Range:[2]	0 to 160 MHz	0 to 160 MHz	0 to 160 MHz	Other ΔF sweep widths available
Frequency Accuracy (25° C):				
CW Mode	±5 MHz	±8 MHz	±14 MHz	±0.15% of center frequency selected or ±5 MHz, whichever is greater
ΔF Mode (center frequency)	±6 MHz	±9 MHz	±15 MHz	±0.15% of center frequency selected or ±5 MHz, whichever is greater
ΔF Mode (as a % of ΔF being swept)	±10%	±10%	±10%	±10%
Frequency Stability:				
With Time: Any 15-minute interval after 15-minute warmup	±500 kHz	±750 kHz	±1.5 MHz	±0.012% of absolute frequency or 500 kHz, whichever is greater
With Temperature (0 to 50° C)	±250 kHz/°C	±500 kHz/°C	±1.0 MHz/°C	±0.012% of absolute frequency/°C or 500 kHz/°C, whichever is greater
With Line Voltage (103-127V)	±100 kHz	±100 kHz	±100 kHz	±100 kHz
With 10 dB Power Level Change	±500 kHz	±500 kHz	±500 kHz	±500 kHz

Table 1-1. Specifications (2 of 3)

Specifications	4 GHz Band	6 GHz Band	11 GHz Band	Other Bands Desired[1]
Frequency Stability (cont'd):				
Residual FM-CW Mode	<15 kHz peak	<15 kHz peak	<25 kHz peak	Depends on frequency band
Linearity: As % of sweep width for widths greater than 5 MHz	±2.5%	±2.5%	±2.5%	±2.5%
Power Output				
Maximum Leveled Power:				
Externally leveled with accessory 784A directional detector and 11675A leveling cable assembly attached to front panel RF OUTPUT connector	> +11 dBm (> 12.5 mW)	> +11 dBm (> 12.5 mW)	> +5 dBm (> 3 mW)	Depends on frequency band selected
Maximum Unleveled Power: (At RF OUTPUT connector)	> +13 dBm (> 20 mW)	> +13 dBm (> 20 mW)	> +10 dBm (> 10 mW)	Depends on frequency band selected
Power Output Stability:				
With Time: Any 15-minute interval	< 0.1 dB	< 0.1 dB	< 0.1 dB	< 0.1 dB
Power Variation:				
Externally leveled with 784A directional detector and 11675A leveling cable assembly. Total variation over specified 600 MHz frequency band.	< 0.3 dB	< 0.3 dB	< 0.4 dB	< 0.4 dB over any 600 MHz band 1.7 to 12.4 GHz
Externally leveled with 784A directional detector and 11675A leveling cable assembly. Total variation over any 30 MHz band within specified frequency bands, into a load with SWR of < 1.15.	< 0.03 dB	< 0.03 dB	< 0.03 dB	< 0.03 dB over any 30 MHz band 1.7 to 12.4 GHz
Spurious Signals (down from fundamental output):				
Harmonic in dB	> −40 dB	> −40 dB	> −40 dB	Depends on band
Nonharmonic in dB	> −60 dB	> −60 dB	> −60 dB	> −60 dB typically
Residual AM: AM noise in 100 kHz bandwidth (in dB below carrier at max. rated power - centered on the carrier)	> −40 dB	> −40 dB	> −40 dB	> −40 dB

Table 1-1. Specifications (3 of 3)

GENERAL

Operating Temperature Range: 0° to 50° Centigrade.

Sweep Frequency: Adjustable from approximately 20 to 40 sweeps per second. Option 110, increased sweep speed - used with Model 8325A Waveguide-Cable Test Set. Adjustable from approximately 55 to 120 sweeps per second.

Sweep Output: Direct-coupled sawtooth, zero to approximately +10 volts concurrent with RF and IF sweep. Zero at start of sweep, approximately +10 volts at end of sweep regardless of sweep width. Available at rear panel BNC connector.

Blanking Output: Zero volts during forward trace and +15 volts during retrace. Available at rear panel BNC connector. Note: RF and IF power are always on during trace and retrace for increased stability; thus, only display blanking available.

Counter IF Output Monitor: Rear panel BNC used for counter setup of IF frequencies. Level at IF FREQ MON jack is 0 ± 1.5 dBm when IF oscillator is adjusted for +10 dBm output at 70 MHz.

IF Output Impedance and Connectors: 75-ohm output. Standard output connector is WECO Model 567A jack. 75-ohm BNC connector available with Option 050.

Power: 115 or 230 volts ± 10%, 50 to 400 Hz. Approximately 150 watts.

Dimensions: 5¼ in. (133,4 mm) high, 18 in. (457,2 mm) deep, 16¾ in. (425,5 mm) wide.

Weight: Including RF section, 33 lb. (15,0 kg).

[1] Any band may be selected in the following five primary oscillator ranges: 1.7 to 4.3 GHz; 3.2 to 6.5 GHz; 5.9 to 9.0 GHz; 8.0 to 12.4 GHz; and 10.0 to 13.25 GHz. Multiband configurations allow any two primary oscillators to be installed in the same instrument. Any single primary oscillator may have two sub-bands selected from it.

[2] Sweep width variations cannot exceed the frequency limits of the specified RF band.

1-11. DESCRIPTION

1-12. The Model 8605A Communications Sweep Oscillator, together with one of seven Standard Frequency Band Options, forms a completely solid-state, self-contained IF/RF sweep and CW signal source. The Model 8605A produces sweep frequency and CW signals in the following frequency ranges: 47 to 100 MHz; 3.65 to 4.25 GHz (if included in selected Standard Frequency Band Option); 5.9 to 6.5 GHz (if included in selected Standard Frequency Band Option); and 10.7 to 11.7 GHz (if included in selected Standard Frequency Band Option). Table 1-2 briefly describes the Standard Frequency Band Options.

1-13. The front panel controls are clearly labeled and conveniently grouped for ease of use. Both the IF and RF sections have CW and ΔF sweep modes. The ΔF sweep mode allows the operator to first set the channel or ΔF center frequency and then independently adjust the calibrated sweep width. The IF and RF sections are capable of delivering power output with very flat response to devices under test.

1-14. The IF sweep generator controls are on the right of the mainframe, the multiband RF (microwave) controls are separate and on the left of the mainframe. With IF and RF controls separate and independently adjustable, the operator can switch back and forth between IF and RF measurements without the necessity for readjustment of any of the source settings.

1-15. The multiband RF section features a band switching lever for convenient control of RF frequency range and a highly adaptive, multiband, modular design. The band switching lever rotates the proper dial scale into position, lights up the frequency range in the window to the right of the dial scale and completes all RF and control switching. While 4, 6, and 11 GHz bands are standard options, any other band or bands in the 1.7 to 13.25 GHz frequency range are available.

Table 1-2. Standard Frequency Band Options

Option	Frequency Band (GHz)	Frequency Coverage (GHz)	Typical YIG Oscillator	Driver Board IN XA2	Driver Board IN XA3
001	4	3.65 — 4.25	Transistor	—	1*
002	6	5.9 — 6.5	Transistor	—	2*
003	11	10.7 — 11.7	Bulk-Effect	3*	—
004	4 & 6	3.65 — 4.25 5.9 — 6.5	Transistor	—	4*
005	4 & 11	3.65 — 4.25 10.7 — 11.7	Transistor & Bulk Effect	3*	1*
006	6 & 11	5.9 — 6.5 10.7 — 11.7	Transistor & Bulk Effect	3*	2*
007	4, 6 & 11	3.65 — 4.25 5.9 — 6.5 10.7 — 11.7	Transistor & Bulk Effect	3*	4*

*Driver Board, No. 1 is one-band 3.65—4.25 transistor oscillator driver, HP Part No. 08605-60015.
Driver Board No. 2 is a one-band 5.9—6.5 transistor oscillator driver, HP Part No. 08605-60016.
Driver Board No. 3 is a one-band 10.7—11.7 GHz bulk-effect oscillator driver, HP Part No. 08605-60002.
Driver Board No. 4 is a two-band transistor oscillator driver, HP Part No. 08605-60003.

1-16. OPTIONS

1-17. Options are available to provide (1) standard frequency band coverage, (2) other frequency band coverage, (3) different type of IF OUTPUT connector and (4) increased sweep speed for the Model 8605A Communications Sweep Oscillator.

1-18. Option 001

1-19. The Model 8605A Option 001 provides single-band coverage in the standard frequency band of 3.65 to 4.25 GHz (4 GHz band).

1-20. Option 002

1-21. The Model 8605A Option 002 provides single-band coverage in the standard frequency band of 5.9 to 6.5 GHz (6 GHz band).

1-22. Option 003

1-23. The Model 8605A Option 003 provides single-band coverage in the standard frequency band of 10.7 to 11.7 GHz (11 GHz band).

1-24. Option 004

1-25. The Model 8605A Option 004 provides a two-band coverage in the standard frequency bands of 3.65 to 4.25 GHz and 5.9 to 6.5 GHz.

1-26. Option 005

1-27. The Model 8605A Option 005 provides two-band coverage in the standard frequency bands of 3.65 to 4.25 GHz and 10.7 to 11.7 GHz.

1-28. Option 006

1-29. The Model 8605A Option 006 provides two-band coverage in the standard frequency bands of 5.9 to 6.5 GHz and 10.7 to 11.7 GHz.

1-30. Option 007

1-31. The Model 8605A Option 007 provides three-band coverage in the standard frequency bands of 3.65 to 4.25 GHz, 5.9 to 6.5 GHz, and 10.7 to 11.7 GHz.

1-32. Other Frequency Band Options

1-33. Single band and multiband configurations are provided. Almost any frequency band or bands desired in the 1.7 — 13.25 GHz range are available. Bands may be selected from the following primary oscillator ranges: 1.7 — 4.3 GHz, 3.2 — 6.5 GHz, 5.9 — 9.0 GHz, 8.0 — 12.4 GHz and 10.0 — 13.25 GHz. Multiband configurations allow installation of any two primary oscillators in the same instrument. Up to two sub-bands may be selected from any primary oscillator range. Example: 2 sub-bands selected from 5.9 — 9.0 GHz primary oscillator range, 5.9 — 6.5 GHz and 7.25 — 7.75 GHz.

1-34. Option 050

1-35. The Model 8605A Option 050 provides a 75-ohm BNC IF OUTPUT connector on the rear-panel of the Model 8605A in place of the standard rear-panel WECO Model 567A connector.

1-36. Option 070

1-37. The Model 8605A Option 070 extends the capabilities of the Hewlett-Packard Microwave Link Analyzer IF/BB transmitter to the microwave bands. The 8605A Option 070 is compatible with all HP Microwave Link Analyzers (3700 series).

1-38. Option 110

1-39. The Model 8605A Option 110 is intended for use with the Hewlett-Packard Model 8625A Waveguide-Cable Test Set. Option 110 provides an adjustable sweep speed of from approximately 55 to 120 Hz for the Model 8605A.

1-40. ACCESSORIES SUPPLIED

1-41. A detachable power cord and rack mounting kit are supplied with the Model 8605A. The power cord and rack mounting kit are described in Section II, Installation.

1-42. EQUIPMENT AVAILABLE

1-43. Service Kit

1-44. A service kit is available for the Model 8605A Communications Sweep Oscillator containing a plug-in extender cable, extender boards, adjustment tool and RF Service cables. This may be obtained from Hewlett-Packard by ordering Service Kit Part No. 8620-60030. (See Figure 1-2 and Table 1-3.) This kit provides convenience in aligning and troubleshooting the Model 8605A.

1-45. Model 784A Directional Detector and Model 11675A Leveling Cable Assembly

1-46. The Model 784A Directional Detector and Model 11675A Leveling Cable Assembly provide external RF power leveling for the Model 8605A Communications Sweep Oscillators. The combined use of the Models 784A and 11675A enables the Model 8650A to deliver < 0.03 dB power variation over any 30-MHz RF channel, 6 feet from the instrument.

1-47. RECOMMENDED TEST EQUIPMENT

1-48. Test equipment required to maintain the Model 8605A is listed in Table 1-4. Other equipment may be substituted if it meets or exceeds the critical specifications listed in the table.

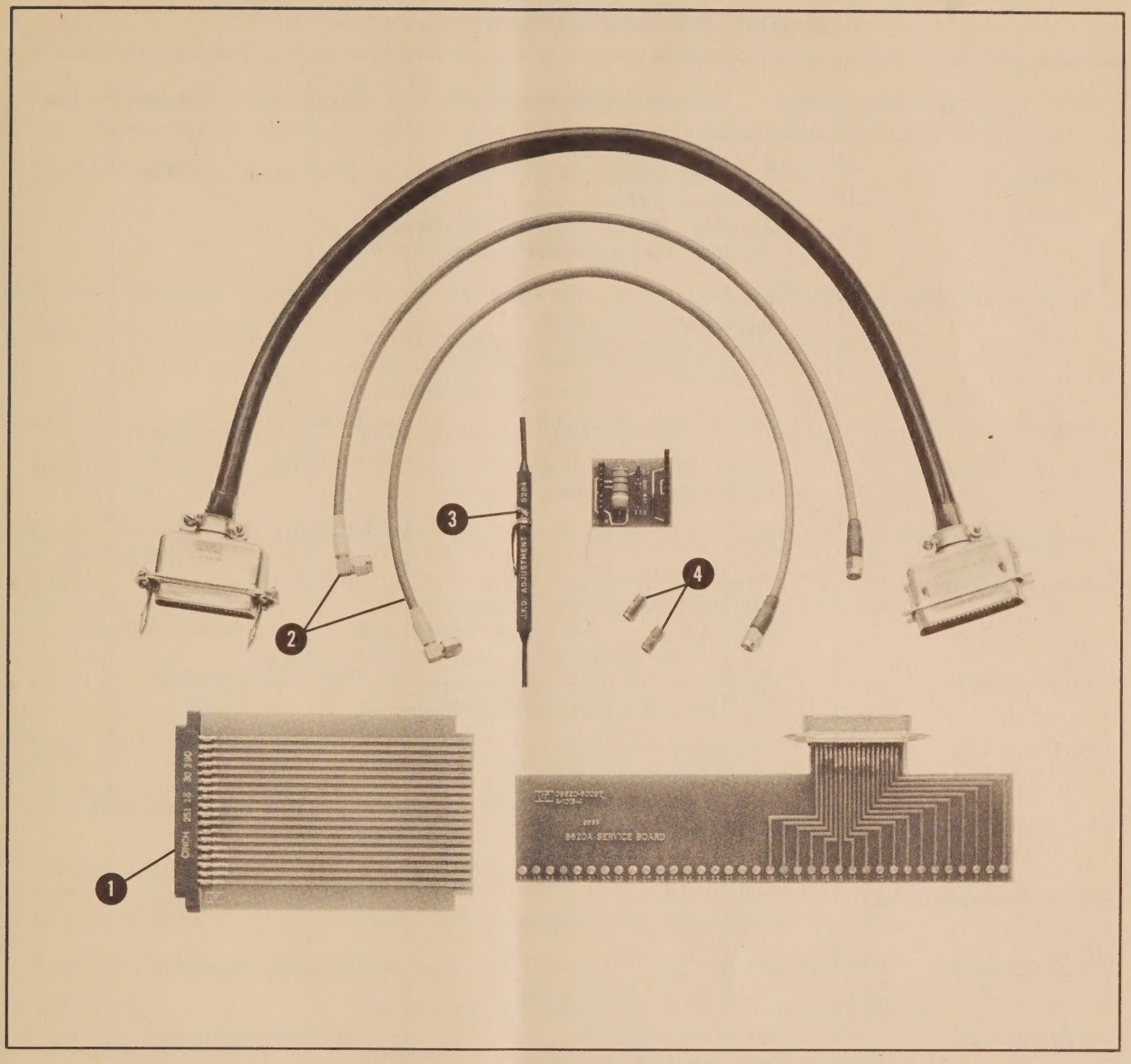


Figure 1-2. Service Kit No. 08620-60030

*Table 1-3. *Equipment in Service Kit No. 08620-60030 Useful in Servicing 8605A*

Ref. Des.	Qty.	Description	Part Number
1	1	18 pin Extender Board	5060-2041
2	2	RF Connector, straight adapter, SMA Jack to SMA Jack	1250-1158
3	1	Alignment Tool	8830-0024
4	2	RF Service Cable	8120-1578

*This equipment may also be ordered by individual part numbers shown in table.

Table 1-4. Recommended Test Equipment (1 of 2)

Instrument	Critical Specification	Recommended Model	Use*
Oscilloscope	Frequency Response: DC to 400 kHz Time Base: 5 nsec to 50 sec Accuracy: 3% Sensitivity: 50 μV/cm with dc offset	HP 140A/1420A/1406A	P,A,T
DC Digital Voltmeter	Accuracy: 0.004% Input Impedance: 10 MΩ Automatic Range Selection: range to 50 Vdc	HP 3460B	P,A,T
Frequency Prescaler	Scaling Factor: 2, 4 and 8	HP 5252A	P,A,T
Frequency Counter	Range: 40 MHz to 12 GHz Input Sensitivity: 0 dBm	HP 5245L	P,A,T
Frequency Divider	Range: 1 - 12.4 GHz	HP 5260A	P,A,T
Directional Coupler	Frequency: 3.65 to 11.7 GHz Coupling Variation: $<\pm$ 0.75 dB SWR: 1.2	HP 779D	P,A,T
Crystal Detector	Frequency: 100 kHz to 1.2 GHz BNC Input and Output, 75Ω Output	HP 8471A, Option 006	P,A,T
Crystal Detector	Frequency: 47 to 100 MHz; and 3.65 to 11.7 GHz RF Leakage >-40 dB, Flatness $<$.1 dB/30 MHz Positive Output	HP H28-423A	P,A,T
10 dB Attenuator (2 req.)	SWR: $<$ 1.3 Attenuation: 10 dB ± 0.5 dB	HP 8491A, Option 010	P,A,T
6 dB Attenuator	SWR: $<$ 1.3 Attenuation: 6 dB ± 0.3 dB	HP 8491A, Option 006	P,A,T
3 dB Attenuator	SWR: $<$ 1.3 Attenuation: 3 dB ± 0.3 dB	HP 8491A, Option 003	P,T
Clip-on Milliammeter	Range: 65 to 220 mA	HP 428B	T
Power Meter and Thermistor Mount	Frequency: 47 to 100 MHz; and 3.65 to 11.7 GHz Range: +10 dBm to -20 dBm	HP 432A/8478B	P,A,T
Directional Detector and Leveling Cable	Frequency: 3.65 to 11.7 GHz Flatness: 0.03 dB over 30 MHz	HP 784A/11675A	P,A,T
Spectrum Analyzer	Frequency Range: 47 MHz to 23.4 GHz	HP 8555A/8552B/141T	P,A
Comb Generator	Markers Frequency: 1, 10 and 100 MHz	HP 8406A	P,A,T
Adjustable AC Line Transformer	Output: 100 to 130 Vac Power: 150 watts	General Radio MT3A	P

Table 1-4. Recommended Test Equipment (2 of 2)

Instrument	Critical Specification	Recommended Model	Use*
RMS Voltmeter	Scale: RMS volts Accuracy: ± 5% Frequency Range: 10 Hz to 2 MHz Dynamic Range: 60 dBm minimum	HP 3400A	P
Function Generator	Output: ± 3V p-p, 1 kHz	HP 3310A	P
SPST Microwave Switch	Frequency Range: 0.1 to 12.4 GHz Maximum Attenuation: 42 to 80 dB Switching Speed: 50 nsec	HP 33104A	P
Frequency Meter (with internal 10 kHz low-pass filter)	Frequency Range: 10 kHz to 1 MHz Accuracy: 1%	HP 5210A/10531A	P
Frequency Counter with Transfer Osc.	Range: 3.65 to 11.7 GHz	HP 5245L/5257A	P
D/A Converter and Strip Chart Recorder	D/A Accuracy: 0.5% of full scale D/A Transfer Time: 1 ms Recorder Accuracy: better than 0.2% of full scale Recorder Response Time: 0.5s or less for full scale Recorder Linearity: 0.1%	HP 581A/680	A
RF Service Cable**	Impedance: 50 ohms Connectors: SMA to SMA	HP 8120-1578	T
RF Connector Adapter**	SMA Jack to SMA Jack	HP 1250-1158	T
Extender Board**	18-pin Cinch Connector	HP 5060-2041	T,A
Alignment Tool**	Hex end, non-magnetic	HP 8830-0024	A
End Wrench	5/16 inch special box end slotted	HP 08555-20097	T
Adapter, Type N to SMA	Frequency Range: DC - 11.7 GHz	HP 1250-1404	T
Adapter, Type N to Subminiature RF	Frequency Range: DC to 500 MHz	HP 1250-1152	A
Type N Tee (2 req.)	Connector: N Jack, N Plug, N Jack	UG-107B/U	P,A,T
BNC Tee	Connector: BNC Jack, BNC Plug	HP 1250-0781	P,A,T
Adapter, Type N to BNC (2 req.)	Frequency Range: DC - 11.7 GHz	HP 1250-0780	P,A,T
Adapter, Type N Male to Male	Frequency Range: DC - 11.7 GHz	HP 1250-0777	P,A,T
Adapter, Type N Female to Female	Frequency Range: DC - 11.7 GHz	HP 1250-0778	P,A,T

*A = Adjustment; P = Performance Test; T = Troubleshooting. ** These parts included in Service Kit 08620-60030.

SECTION II
INSTALLATION

2-1. INTRODUCTION

2-2. This section provides installation instructions for the Model 8605A Communications Sweep Oscillator and its supplied accessories. This includes information about initial inspection, packaging, storage, and damage claims.

2-3. INITIAL INSPECTION

2-4. Inspect the shipping container for damage. If the shipping container or cushioning material is damaged it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked mechanically and electrically. The contents of the shipment should be as shown in Figure 1-1, and procedures for checking electrical performance are given in Section IV. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, notify the nearest Hewlett-Packard office. If the shipping container is damaged, or the cushioning material shows signs of stress, notify the carrier as well as the Hewlett-Packard office. Keep the shipping materials for carrier's inspection. The HP office will arrange for repair or replacement without waiting for claim settlement.

2-5. PREPARATION FOR USE

2-6. Power Requirements

2-7. The instrument requires a power source of 115 or 230 Vac ± 10%, 50 to 400 Hz single phase. Power required is approximately 150 watts.

2-8. Selecting 115- or 230-Volt Operation

CAUTION

To avoid damage to the instrument, set the 115/230 volt switch for the line voltage to be used and insert the proper fuse before connecting the power cable.

2-9. A rear panel two-position slide switch permits instrument operation from either a 115 or 230 volt ac power source. To change the slide switch position:

a. Disconnect power cable from rear of instrument.

b. Slide plastic window covering fuse compartment to one side, exposing the fuse.

c. Pull outward on the FUSE PULL lever, exposing the 115/230 Vac slide switch.

d. Position the 115/230 slide switch so that the number opposite the slider corresponds to the line source voltage. Insert the proper fuse.

2-10. RF Flatness Compensation

2-11. When the Leveling Cable Assembly Model 11675A and Directional Detector Model 784A are used to externally level the 8605A RF power, go to Section V, paragraph 5-17 and perform steps a through k of the RF POWER OUTPUT FLATNESS ADJUSTMENT. This adjustment must be performed initially and anytime the Leveling Cable Assembly or Directional Detector is changed. The RF power output flatness adjustment compensates for slope introduced by the Leveling Cable Assembly and the Directional Detector, allowing the Model 8605A to deliver < 0.03 dB power variation over any 30 MHz RF band.

2-12. Power Cable

2-13. To protect operating personnel, the National Electrical Manufacturers' Association (NEMA) recommends that instrument panels and cabinets be grounded. Accordingly, the instrument is equipped with a three-conductor power cable which grounds the panel and cabinet when plugged into an appropriate receptacle. The offset pin of the three-prong connector is the ground pin. To preserve the protection feature when operating the instrument from a two-contact outlet, use a three-prong to two-prong adapter (HP Stock No. 1251-0048(and connect the pigtail on the adapter to ground.

2-14. Cooling

2-15. Clearances for ventilation should be three to four inches at the rear of the cabinet and two to three inches at the sides. The clearances provided by the plastic feet in bench stacking and the filler strips in rack mounting are adequate for the top and bottom cabinet surfaces.

2-16. Bench Operation

2-17. The instrument cabinet has plastic feet and a foldaway tilt stand for convenience in bench operation. The tilt stand includes the instrument for ease in reading the scale. The plastic feet provide clearance for air circulation and make the instrument self-aligning when stacked on other Hewlett-Packard full rack-width instruments.

2-18. Rack Mounting

2-19. The rack-mounting kit contains all hardware needed to adapt the instrument cabinet for installation in equipment racks having standard 19-inch spacing. Preparation for rack mounting is illustrated in Figure 2-1.

2-20. STORAGE AND SHIPMENT

2-21. Shipping Environment

2-22. The instrument should be kept free from dampness as much as possible to prevent voltage breakdown due to moisture.

2-23. Repackaging

2-24. Original Packaging. The same type containers and materials used in factory packaging can be obtained through the nearest Hewlett-Packard offices. If the instrument is being returned to Hewlett-Packard for servicing, attach a tag indicating the type of service required, return address, model number and full serial number. Also mark the container FRAGILE to assure careful handling. In any correspondence refer to the instrument by model number and full serial number.

2-25. Other Packaging Materials. The following general instructions should be used for repackaging with commercially available materials.

a. Wrap the instrument in heavy paper or plastic. (If shipping to a Hewlett-Packard service office or center, attach a tag indicating the type of service required, return address, model number, and full serial number.)

b. Use a strong shipping container. A double-wall carton made of 350 pound test material is adequate.

c. Use enough shock-absorbing material (three to four inch layer) around all sides of the instrument to provide firm cushioning and prevent movement inside the container. Protect control panel with cardboard.

d. Seal the shipping container securely and mark it FRAGILE to assure careful handling.

e. In any correspondence, refer to instrument by model number and full serial number.

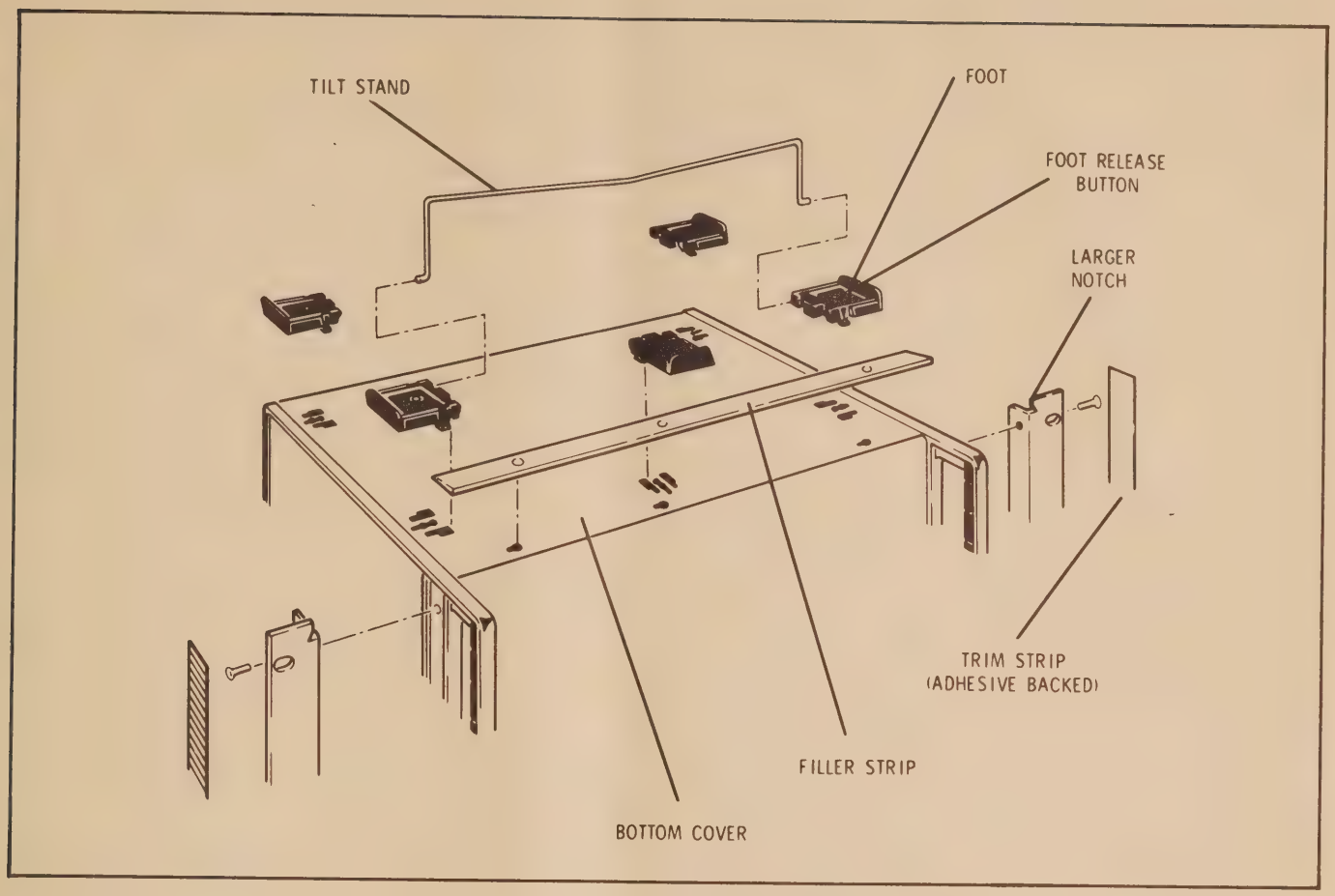


Figure 2-1. Preparation for Rack Mounting

SECTION III
OPERATION

3-1. INTRODUCTION

3-2. This section explains the function of the controls and indicators of the Model 8605A Communications Sweep Oscillator. It also describes how to operate each mode and function. Typical operator maintenance such as fuse replacment is also included in this section.

3-3. PANEL FEATURES

3-4. Front and rear panel features are described in Figures 3-1 and 3-2. Description numbers match the numbers on the illustration.

3-5. OPERATOR'S CHECK

3-6. The operator's check (Figure 3-3) is supplied to allow the operator to make a quick check of the main instrument functions prior to use. If the correct indications are not obtained, follow the appropriate troubleshooting tree in Section VIII to isolate the problem.

3-7. OPERATING INSTRUCTIONS

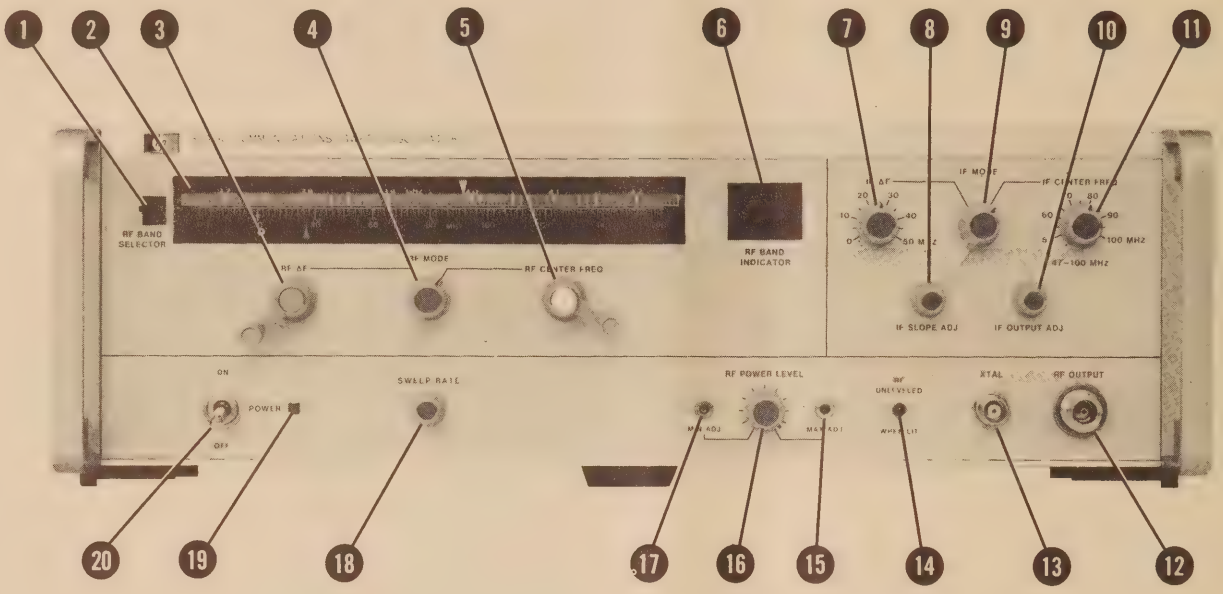
3-8. Figures 3-5 through 3-8 show general operating procedures for the Model 8605A Communications Sweep Oscillator.

3-9. OPERATOR'S MAINTENANCE

3-10. Fuse Location and Replacement

3-11. Up to two fuses are provided in the Model 8605A Communications Sweep Oscillator. The main ac line fuse is located at the back of the instrument next to the line cord jack. The ac line cord must be removed and the plastic cover moved to one side in order to gain access to the fuse compartment. The fuse may be removed by pulling the lever inside the fuse compartment. When 115 Vac supply source is used, the line fuse should be 2.0 amperes and when 230 Vac supply source is used, the line fuse should be 1.0 ampere. The other fuse is located inside the instrument. This fuse is of the plug-in type and is located on the A2 printed circuit board assembly (Options 003, and 005 through 007 only). Access to this fuse requires removing the instrument top cover and the A2 assembly. The fuse may be removed by pulling it straight out. See the parts list in Section VI for fuse type and current rating.

FRONT PANEL FEATURES



1 RF BAND SELECTOR Lever. Depressing the lever advances the drum contaning the frequency scale. Either of three scales may be selected. When a scale is selected at the window, band switches select the corresponding frequency range from the oscillator.

2 Frequency Scale Window. The band selected is displayed at the window. The white pointer selects CW frequency or ΔF center frequency along the top scale and the blue pointer selects ΔF deviation (from center frequency) along the bottom scale.

3 RF ΔF Crank Control. The blue "RF ΔF" knob insert is color coded to the blue pointer on the scale. The RF ΔF crank control drives a potentiometer together with the blue pointer to select the sweep deviation from center frequency. (The center frequency for ΔF is shown by the white pointer and selected by the RF CENTER FREQ control).

4 RF MODE Switch. This switch selects either RF CENTER FREQ output or RF ΔF swept mode. The RF CENTER FREQ mode provides a single frequency signal selected by the RF CENTER FREQ control. The RF ΔF swept mode produces a swept frequency signal with deviation on either side of the CW center frequency selected. Deviation is selected by the RF ΔF control and center frequency is selected by the RF CENTER FREQ control.

5 RF CENTER FREQ Crank Control. The white "RF CENTER FREQ" knob insert is color coded to the white pointer on the scale. The crank control sets the position of the white pointer. The white pointer indicates either the CW frequency, when operating in RF CENTER FREQ mode, or indicates the center frequency when operating in RF ΔF mode.

6 RF BAND INDICATOR. This window displays a lighted readout of the frequency range selected by the band switch. The band scale and this display correspond.

Figure 3-1. Front Panel Controls and Connectors (1 of 2)

FRONT PANEL FEATURES

7 IF ΔF Control. This control selects the deviation from center frequency of the IF signal. The ΔF deviation is continuously adjustable between zero and 53 MHz.

8 IF SLOPE ADJ Control. This control sets the flatness or slope of the swept IF output signal. Adjusting control counterclockwise produces positive slope vs. frequency. This corrects for losses in external cables.

9 IF MODE Switch. This switch selects either ΔF swept IF mode (IF ΔF position) or CW IF output (IF CENTER FREQ position).

10 IF OUTPUT ADJ Control. This control sets the power level at the rear panel IF OUTPUT connector. The output range is approximately +9 to +11 dBm.

11 IF CENTER FREQ Control. This control adjusts the frequency of either the CW IF signal or, if the IF signal is being swept in ΔF mode, this control sets the center frequency. The IF frequency may be adjusted in the range of 47 to 100 MHz.

12 RF OUTPUT Connector. This is a type-N 50-Ohm connector for the RF output signal.

13 XTAL Leveling Input Connector. This is a BNC connector to input the detected RF level from a crystal detector for external leveling in swept mode. The 784A Directional Detector is recommended for external leveling.

14 RF UNLEVELED WHEN LIT Light. This light comes on when the RF sweep signal is not leveled it stays out as long as leveling is maintained.

15 RF POWER LEVEL MAX ADJ. Control. This control sets the maximum leveled power output with the RF POWER LEVEL control set fully clockwise.

16 RF OUTPUT ADJ Control. This control adjusts the level output at the RF OUTPUT connector.

17 RF POWER LEVEL MIN ADJ Control. This control sets the minimum leveled power output with the RF POWER LEVEL control set fully counterclockwise (nominally 0 dBm).

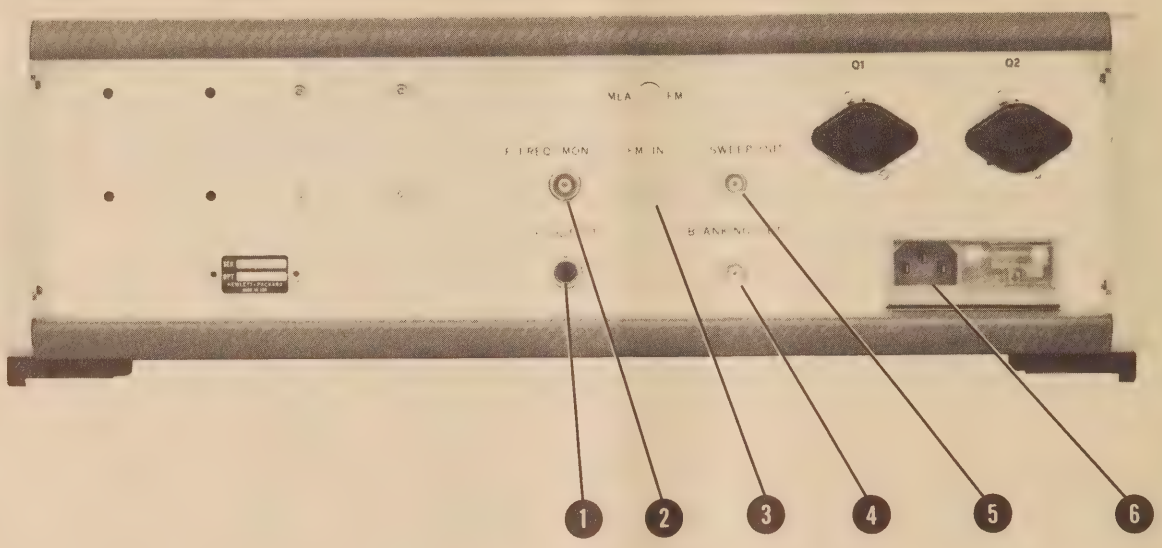
18 SWEEP RATE Control. This control sets the sweep rate of both the RF and IF. The control has an adjustment range of 20 to 40 Hz.

19 POWER Light. This light comes on when the POWER switch is placed in the ON position.

20 POWER Switch. This switch controls the application of primary power to the instrument. When the switch is placed in the ON position, the POWER light comes on.

Figure 3-1. Front Panel Controls and Connectors (2 of 2)

REAR PANEL FEATURES



1 IF OUTPUT Connector. This Bell System (WECO 567A) jack furnishes the IF output signal. The IF output signal level is nominally +10 dBm into a 75-Ohm system. The output level can be adjusted between +9 and +11 dBm by the front panel IF OUTPUT ADJ control.

2 IF FREQ MON Connector. This BNC connector may be used for monitoring the IF frequency. The signal level is nominally zero dBm into a 50-Ohm system.

3 FM IN Connector (Option 070 only). Provides baseband plus sweep input for use with Hewlett-Packard Microwave Link Analyzers (3700 series).

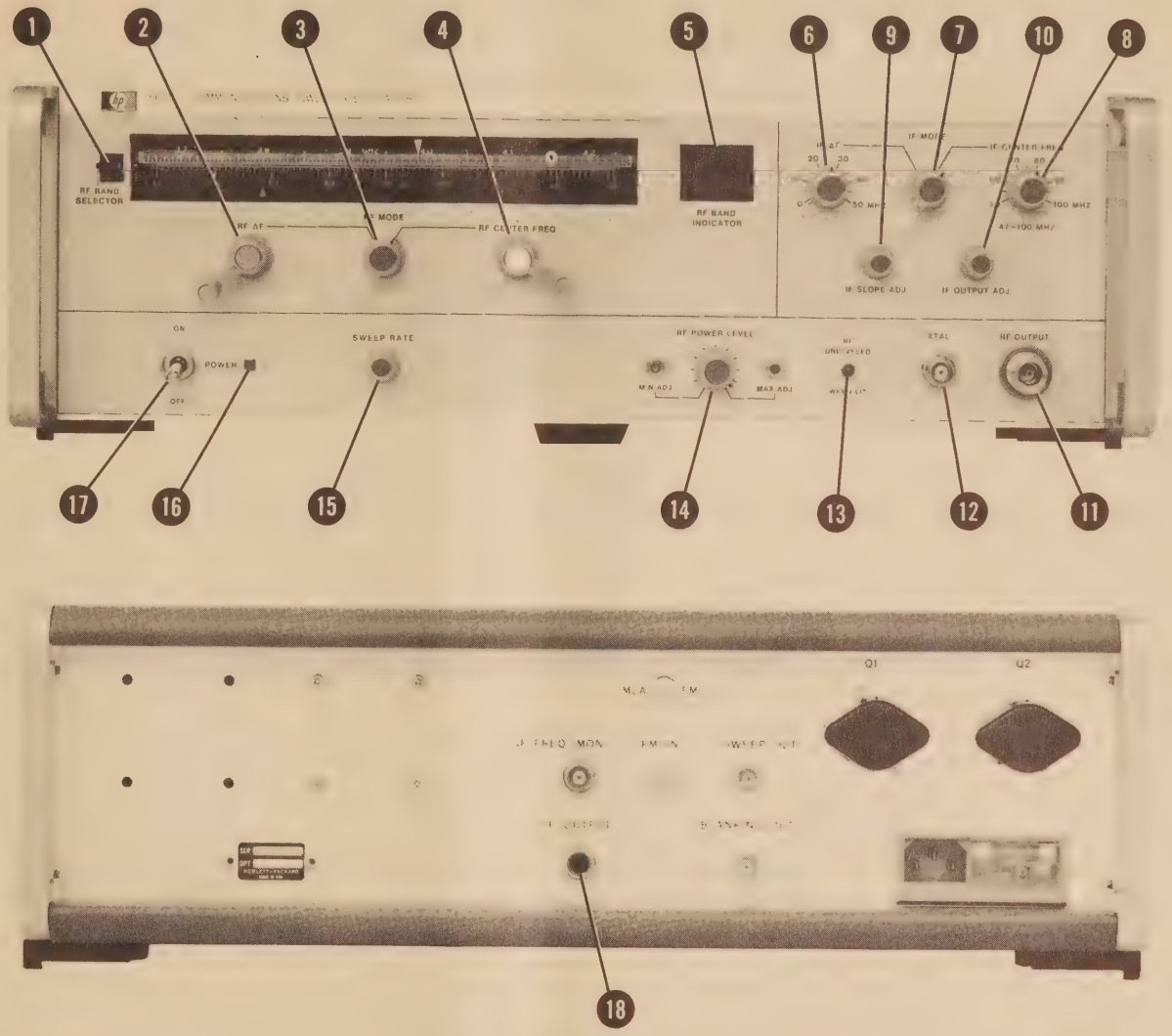
4 BLANKING OUTPUT Connector. This BNC connector supplies +15 volts during retrace and zero volt during sweep.

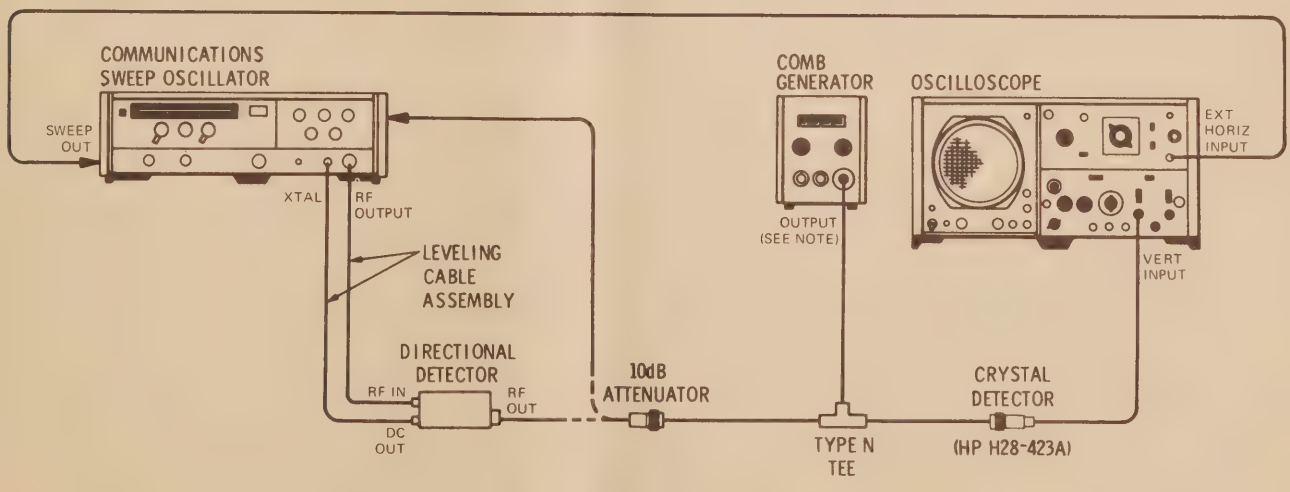
5 SWEEP OUT Connector. This BNC connector supplies a zero to 10-volt sweep ramp signal that can be used to sweep a display instrument. The frequency is nominally 31 Hz.

6 Power Input Switch and Fuse. The input power switch allows selection of either 115 or 230 Vac operation. To change the switch position, the power cable must be disconnected from the rear of the instrument. This allows the plastic window covering the fuse compartment to slide to one side, exposing the fuse. To either change fuses, or to change the 115/230 Vac switch position, pull outward on the lever in the fuse compartment.

Figure 3-2. Rear Panel Controls and Connectors

OPERATOR'S CHECK





NOTE

Connect type N Tee directly to output connector of comb generator.

Figure 3-3. Operator's Check (1 of 3)

OPERATOR'S CHECK

EQUIPMENT:

Oscilloscope	HP 140A/1406A/1420A
Crystal Detector	HP H28-423A
10-dB Attenuator	HP 8491A, Option 010
Comb Generator	HP 8406A
Directional Detector	HP 784A
Leveling Cable Assembly	HP 11675A
Type N Tee Connector	UG-107B/U
Communications Sweep Oscillator	HP 8605A

PROCEDURE:

a. Connect 8605A RF OUTPUT connector (11) to comb generator output as shown in Figure 3-3 (1 of 3). Set comb generator for a 10-MHz output.

b. Set 8605A controls as follows:

POWER (17)	OFF
RF BAND SELECTOR (1)	Selected frequency range
RF MODE (3)	RF ΔF
RF CENTER FREQ (4)	Center of scale
RF ΔF (2)	40 MHz
SWEEP RATE (15)	Fully clockwise
IF MODE (7)	IF ΔF
IF CENTER FREQ (8)	70 MHz
IF ΔF (6)	40 MHz
IF SLOPE ADJ (9)	Mid-position
IF OUTPUT ADJ (10)	Fully clockwise

c. Set the POWER switch (17) to ON position to turn on the instrument. The POWER light (16) should light and the desired band should be indicated by the RF BAND INDICATOR (5).

NOTE

Allow the instrument a 30-minute warmup period before proceding.

d. Check that the RF Section of the 8605A is sweeping correctly. The oscilloscope trace should have a 40-MHz comb (five "birdies") and the 8605A RF UNLEVELED WHEN LIT light (13) should not be lit. If the light is lit, reduce RF output power by turning 8605A RF POWER LEVEL control (14) counterclockwise until the RF UNLEVELED WHEN LIT light goes out.

e. Set the RF CENTER FREQ control (4) so the first "birdie" appears at the beginning of the oscilloscope trace. The oscilloscope display should look similar to that shown in Figure 3-4.

f. Connect 8605A IF OUTPUT connector (18) to comb generator output as shown in Figure 3-3 (1 of 3).

Figure 3-3. Operator's Check (2 of 3)

OPERATOR'S CHECK

g. Check that the IF section of the 8605A is sweeping correctly.

h. Set the IF CENTER FREQ control so the first "birdie" appears at the beginning of the oscilloscope trace. The oscilloscope trace should have a 40-MHz comb similar to that shown in Figure 3-4.

Figure 3-3. Operator's Check (3 of 3)

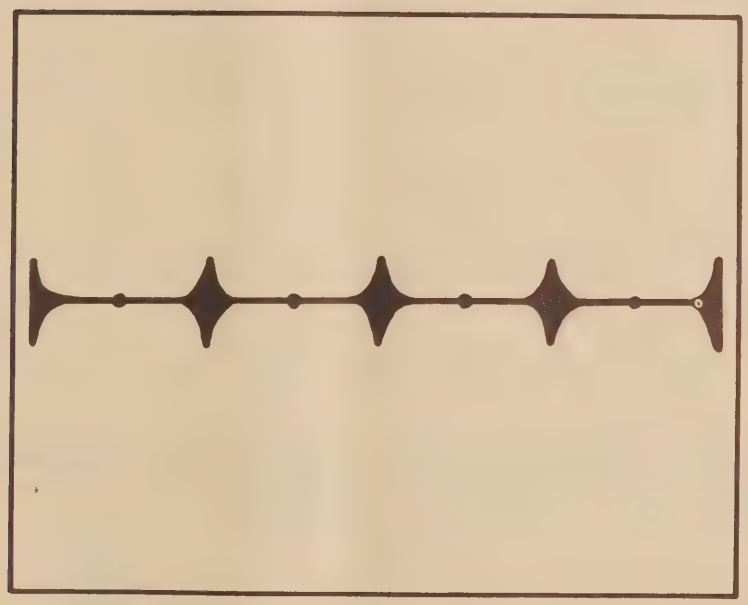
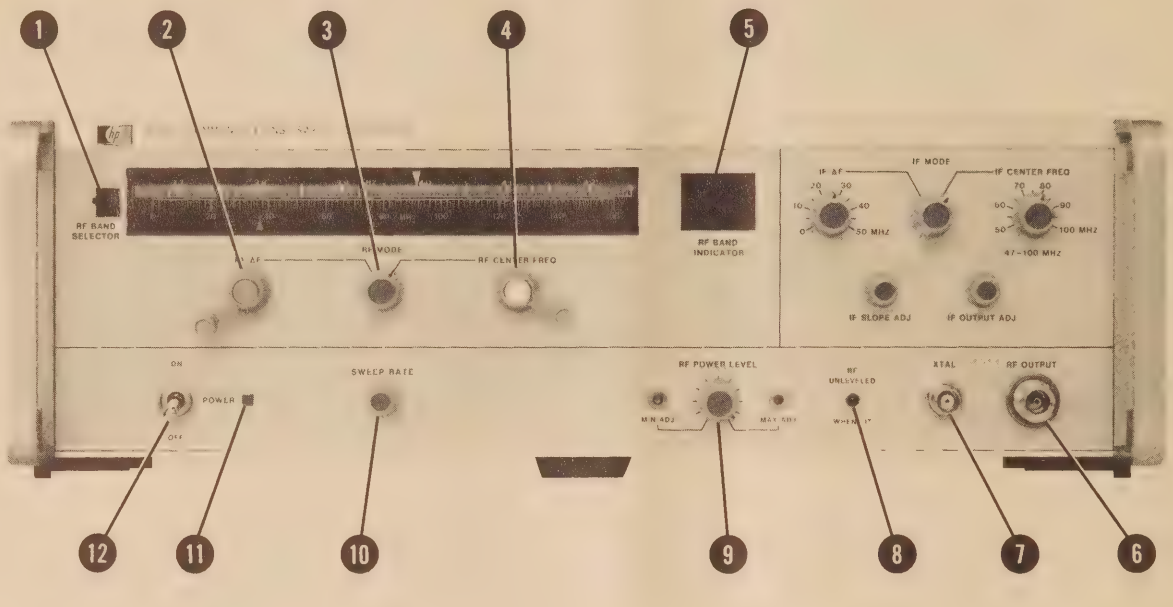


Figure 3-4. Oscilloscope Display of 40 MHz Comb

RF ΔF MODE OF OPERATION



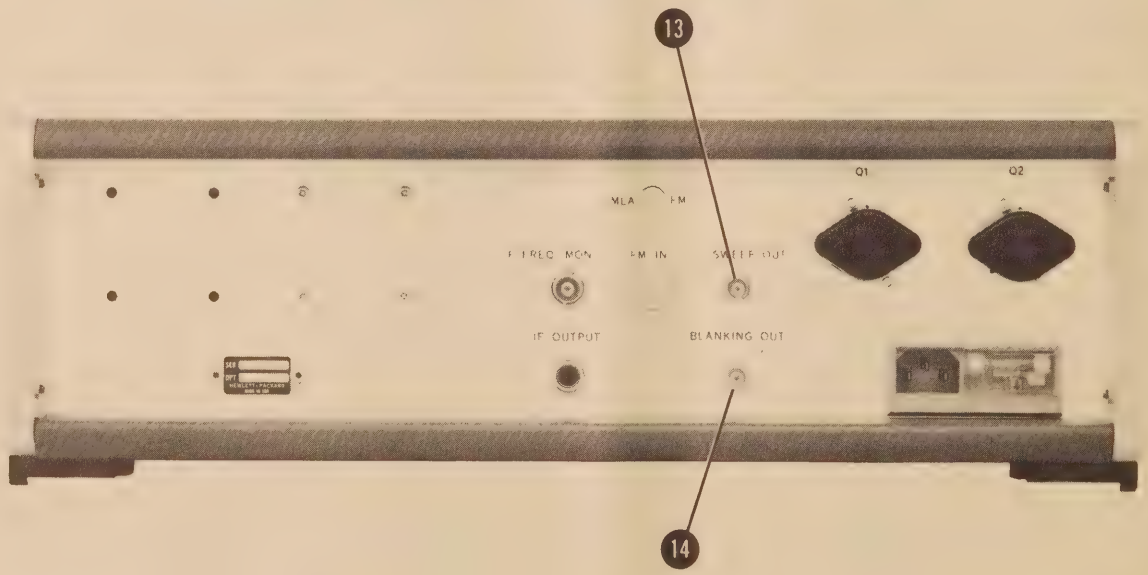


Figure 3-5. RF ΔF Mode of Operation (1 of 2)

RF ΔF MODE OF OPERATION (Cont'd)

PROCEDURE:

a. Connect 8605A RF OUTPUT connector (6) to device under test. If external RF leveling is desired, connect the dc output of the external detector to 8605A XTAL connector (7).

b. If external sweep and Z-axis blanking are required for an associated oscilloscope in the test setup, connect the 8605A SWEEP OUT (13) and BLANKING OUT (14) connectors, respectively, to the corresponding connectors on oscilloscope.

c. Set the 8605A controls as follows:

POWER (12)	OFF
RF BAND SELECTOR (1)	Frequency band desired
RF MODE (3)	RF ΔF
RF CENTER FREQ (4)	Center frequency desired
RF ΔF (2)	Amount of deviation (MHz) desired
SWEEP RATE (10)	Mid-position
RF POWER LEVEL (9)	Fully clockwise

d. Set the POWER switch (12) to ON position to turn on the instrument. Observe that the POWER light (11) is lit, and that the desired frequency band is indicated on the RF BAND INDICATOR (5).

NOTE

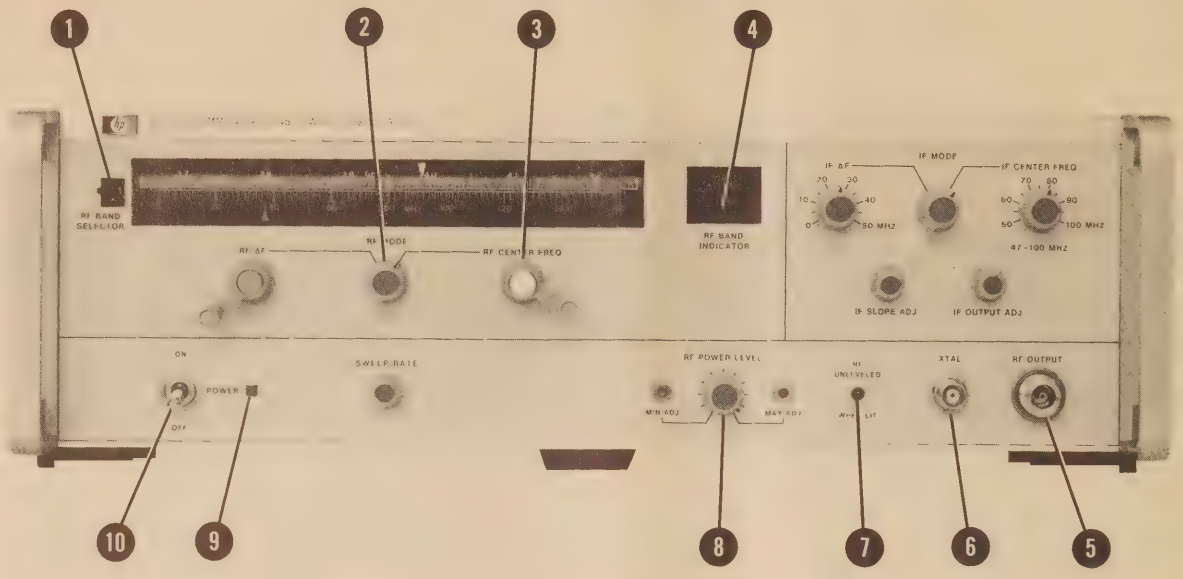
Allow the instrument a 30-minute warmup period before proceeding to the next step.

e. If the RF UNLEVELED WHEN LIT light (8) is lit when using external leveling, turn the RF POWER LEVEL control (9) in the counterclockwise direction until the light goes out.

f. If it is desired to change the sweep speed, turn the sweep rate control (10) in a counterclockwise or clockwise direction to decrease or increase, respectively, the sweep rate.

Figure 3-5. RF ΔF Mode of Operation (2 of 2)

RF CW MODE OF OPERATION



PROCEDURE:

a. Connect 8605A RF OUTPUT connector (5) to device under test. If external RF leveling is desired, connect the dc output of the external detector to 8605A XTAL connector (6).

b. Set the 8605A controls as follows:

POWER (10)	OFF
RF BAND SELECTOR (1)	Frequency band desired
RF MODE (2)	RF CENTER FREQ
RF CENTER FREQ (3)	CW frequency desired
RF POWER LEVEL (8)	Fully clockwise

c. Set the POWER switch (10) to ON position to turn on the instrument. Observe that the POWER light (9) is lit, and that the desired frequency band is indicated on the RF BAND INDICATOR (4).

NOTE

Allow the instrument a 30-minute warmup period before proceeding to the next step.

d. If the RF UNLEVELED WHEN LIT light (7) is lit when using external leveling, turn the RF POWER LEVEL control (8) in the counterclockwise direction until the light goes out.

Figure 3-6. RF CW Mode of Operation

IF ΔF MODE OF OPERATION

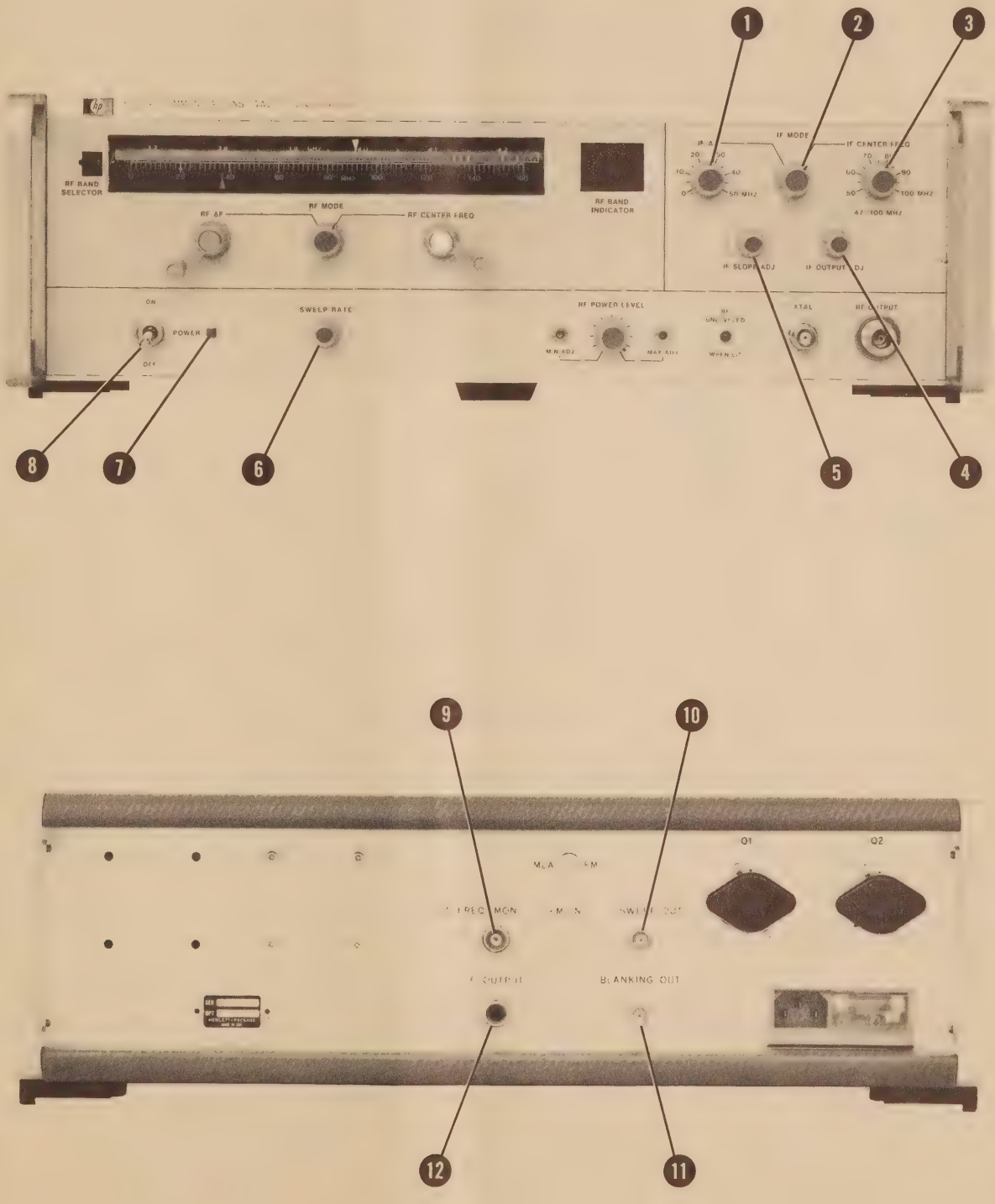


Figure 3-7. IF ΔF Mode of Operation (1 of 2)

IF ΔF MODE OF OPERATION (Cont'd)

PROCEDURE:

a. Connect 8605A IF OUTPUT connector (12) to device under test. If monitoring of the IF center frequency is desired, connect a frequency counter to 8605A IF FREQ. MON connector (9).

b. If external sweep and Z-axis blanking are required for an oscilloscope in the test setup, connect 8605A SWEEP OUT (10) and BLANKING OUT (11) connectors, respectively, to the corresponding connectors on oscilloscope.

c. Set the 8605A controls as follows:

POWER (8)	OFF
IF MODE (2)	IF ΔF
IF CENTER FREQ (3)	Center frequency desired
IF ΔF (1)	Amount of deviation (MHz) desired
IF SLOPE ADJ (5)	Mid-position
IF OUTPUT ADJ (4)	Mid-position
SWEEP RATE (6)	Mid-position

d. Set the POWER switch (8) to ON position to turn on the instrument. Observe that the power light (2) is lit.

NOTE

Allow the instrument a 30-minute warmup period before proceeding to the next step.

NOTE

The following step assumes that the swept IF signal is being monitored by a power meter and oscilloscope in the test setup.

e. If it is desired to change the IF power output, turn the IF OUTPUT ADJ control (4) in the counterclockwise or clockwise direction to decrease or increase respectively, the power level. Then, readjust the IF SLOPE ADJ control (5) so that the level of swept IF input to the device under test is as flat as possible.

f. If it is desired to change the sweep speed, turn the Sweep Rate control (6) in the counterclockwise or clockwise direction to decrease or increase, respectively, the sweep rate.

Figure 3-7. IF ΔF Mode of Operation (2 of 2)

IF CW MODE OF OPERATION

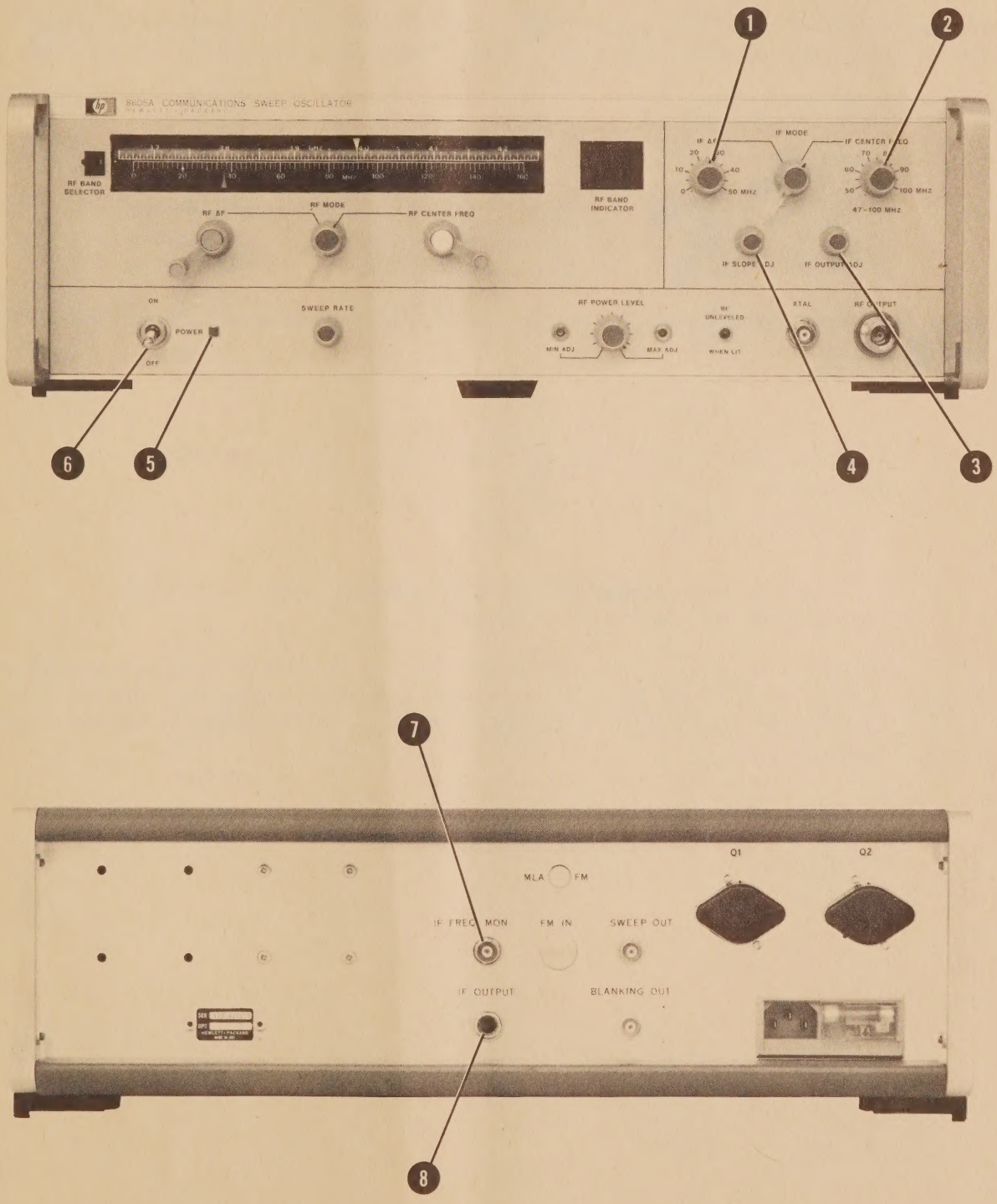


Figure 3-8. IF CW Mode of Operation (1 of 2)

IF CW MODE OF OPERATION (Cont'd)

PROCEDURE:

a. Connect 8605A IF OUTPUT connector (8) to device under test. If monitoring of the IF CW frequency is desired, connect a frequency counter to 8605A IF FREQ. MON connector (7).

b. Set the 8605A controls as follows:

POWER (6)	OFF
IF MODE (1)	IF CENTER FREQ
IF CENTER FREQ (2)	CW frequency desired
IF SLOPE ADJ (4)	Mid-position
IF OUTPUT ADJ (3)	Mid-position

c. Set the POWER switch (6) to ON position to turn on the instrument. Observe that the POWER light (5) is lit.

NOTE

Allow the instrument a 30-minute warmup period before proceeding to the next step.

NOTE

The following step assumes that the IF CW signal is being monitored by a power meter and oscilloscope in the test setup.

d. If it is desired to change the IF power output, turn the IF OUTPUT ADJ control (3) in a counterclockwise or clockwise direction to decrease or increase, respectively, the power level. Then, readjust the IF SLOPE ADJ control (4) so that level of IF CW input to the device under test is as flat as possible.

Figure 3-8. IF CW Mode of Operation (2 of 2)

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